DOCUMENT RESUME

ED 466 194 IR 021 265

AUTHOR	McMahon, Mark; Oliver, Ron
TITLE	Promoting Self-Regulated Learning in an On-Line Environment.
PUB DATE	2001-00-00
NOTE	8p.; In: ED-Media 2001 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings (13th, Tampere, Finland, June 25-30, 2001); see IR 021 194.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 2966, Charlottesville, VA 22902 ($40, AACE members; $50, nonmembers). Tel: 804-973-3987; Fax: 804-978-7449; Web site: http://www.aace.org.
PUB TYPE	Information Analyses (070) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Cognitive Processes; Computer Assisted Instruction; *Distance Education; Educational Environment; Foreign Countries; Higher Education; *Independent Study; *Learner Controlled Instruction; *Metacognition; Nontraditional Education; *Web Based Instruction
IDENTIFIERS	Australia; *Self Regulated Learning

ABSTRACT

Self-regulation has long been seen as a desirable but difficult to achieve instructional aim. This is particularly true of online learning, where users have limited instructional support and where attrition rates tend to be greater than in face-to-face teaching. This paper examines the nature of self-regulation, identifying affective and cognitive skills that make for self-regulated learners. The broad psychological states of metacognition and self-concept are identified as well as the motivational and cognitive processes that underpin them. The volitional, learning, and regulatory strategies that learners use are delineated. These are placed within the context of online learning. Aspects that characterize learning environments that support self-regulation are identified, and suggestions are made as to how self-regulation can best be enhanced within online courses. (Contains 17 references.) (Author/AEF)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 466 194

PROMOTING SELF-REGULATED LEARNING IN AN ON-LINE ENVIRONMENT

Mark McMahon
School of Communications and Multimedia
Edith Cowan University
2 Bradford Street
Mt Lawley 6050
Western Australia
m.mcmahon@ecu.edu.au

Ron Oliver
School of Communications and Multimedia
Edith Cowan University
2 Bradford Street
Mt Lawley 6050
Western Australia
r.oliver@ecu.edu.au

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Abstract: Self-Regulation has long been seen as a desirable but difficult to achieve instructional aim. This is particularly true of on-line learning, where users have limited instructional support and where attrition rates tend to be greater than in face-to-face teaching. This paper examines the nature of self-regulation, identifying affective and cognitive skills which make for self-regulated learners. The broad psychological states of metacognition and self-concept are identified as well as the motivational and cognitive processes that underpin them. The volitional, learning, and regulatory strategies which learners use are delineated. These are placed within the context of on-line learning. Aspects which characterise learning environments which support self-regulation are identified, and suggestions are made as to how self-regulation can best be enhanced within on-line courses.

A Need for Self Regulation

Universities are moving more and more towards flexible modes of delivering courses; a trend which is impacting on the nature of both teaching and learning. Educators are coming to terms with the challenges of developing courses to be taught remotely and asynchronously, while students, too, are battling with these new modes of delivery. While high school has traditionally been a face-to-face experience, post secondary and tertiary education is limited in its contact time and is being increasingly channelled through Multimedia and Internet resources. This lack of close social interaction significantly diminishes the regulatory mechanisms that ensure students' smooth progression through their course.

This is not necessarily a bad thing. In the end, students must be responsible for their own learning. After all, "learning is not something that happens to students; it is something that happens by students," (Zimmerman 1989, p 21). However, it is unreasonable to assume that students will be coming into a course with the skills to regulate their own learning. (Boekaerts 1997) describes formal schooling as 'outcome based practice sessions' with teachers as experts and students as novices. In more flexible approaches, as in on-line tertiary education, this paradigm is no longer appropriate. Students need to become protagonists in their learning process, using the Internet as a resource for their own learning goals.

It is hardly surprising that there is a high drop-out rate for students with poor study skills when they venture on-line (Loomis 2000). Brooks (1997, p. 135) goes so far as to claim that students "who are poor at self regulation easily can be slaughtered in www-based courses". This does not however acknowledge some of the main benefits of on-line learning – that it is an efficient and flexible environment for users to meet their own learning goals. Attempting to

IR021265

BEST COPY AVAILABLE

remodel on-line learning on a face-to-face paradigm would dilute these benefits. Perhaps most importantly, there is also a need to acknowledge that self-regulated learning is a desirable thing that is important to life as much as school (Boekaerts 1997). If an educator's role is to assist students in becoming better learners, then courses need to be designed not just to meet specific unit outcomes but to scaffold the development of learner's self-regulatory skills. This is particularly true of on-line learning. Rather than throw students 'in at the deep end' mechanisms must be in place which bridge the nexus between supported and self-regulated learning. In order for this to happen, however, a sound understanding of what self-regulation is, and how it can be inculcated within in students, must be developed.

A definition of Self Regulation

Self-regulation is somewhat easier to define than understand. It has been described as 'the process whereby students activate and sustain cognitions, behaviours, and affects, which are systematically oriented toward attainment of their goals' (Schunk & Zimmerman, 1994). This definition is reinforced by (Brooks 1997), who argues that that it is active and goal directed, resulting from self control of behaviour motivation and cognition. This emphasis on multiple constructs places Self-regulated Learning at the junction of several fields of research (Boekaerts 1997). It emphasises students' reliance on their own internal resources to govern their learning, but these resources are not easy to delineate. Self regulated behaviour is an end process, dependent upon the affects and cognitions that precede it. These are to a certain extent inaccessible, since they are internally constructed and not always explicitly articulated by individuals. Also, the notion of self-regulation is prone to multiple interpretations based upon educational philosophy. (Zimmerman 1989) identifies it in terms of Phenomenological, Social Cognitive, Volitional, Vygotskian and Cognitive Constructivist Theories. All of these approaches bring a unique framework to the concept. Behaviourist approaches emphasise self-monitoring, self-instruction and self-reinforcement, while a phenomenological approach defines it in dimensions such as self worth, planning, and goal setting. Common to most of these however, is an acknowledgment of the interaction of affective and cognitive processes at a level of abstraction. Self awareness at a cognitive and emotional level would appear to be the key enabling process in the development of self-regulatory strategies.

A model of Self Regulation

A number of models have been developed to explain the processes that underpin Self-Regulated Learning. (Boekaerts 1997) provides a six component model based upon the following notions:

- Content domain
- Cognitive strategies
- Cognitive regulatory strategies
- Metacognitive knowledge and motivational beliefs
- Motivational strategy use
- Motivational regulatory strategies

These elements are co-dependent and interact with each other in the application and development of goals, strategies and domain-specific knowledge.

(Garcia 1994) articulates self-regulation in terms of knowledge and beliefs, strategies used, and outcomes. Each of these is moderated by motivational and cognitive components such as personal beliefs and conceptual knowledge, motivational and cognitive strategies, and quantity and quality of effort.

Common to both models is an integration of both affective and cognitive issues:

> "Neither motivational nor cognitive models alone can fully describe the various aspects of student academic learning, yet the two types of models are complementary due to the respective strengths and weaknesses of motivational and cognitive models." (Garcia 1994)

Figure 1 represents a synthesis of the above frameworks. It accommodates the role of both affective and cognitive aspects of self regulation, but also acknowledges the effects of external environmental factors upon an individual's ability to regulate their learning. Self regulation is viewed here as the intersection of self awareness at both a rational and emotional level. Metacognition and self concept are seen as the primary enabling process in this model, with self

monitoring and motivation as subordinate processes which are involved in the development of cognitive and motivational strategies. Each will be discussed in turn.

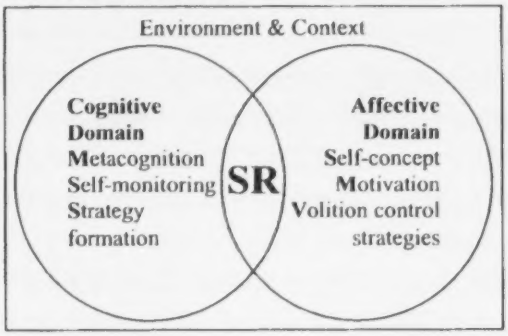

Figure 1 - Model of Self-Regulation

Metacognition and Self-concept

Self awareness has always been an important educational construct. Metacognition can be defined as "knowledge and beliefs about thinking and the factors affecting thinking" which regulate "the articulation of strategy and knowledge" (Pressley 1998). As such it is a necessary precursor to self regulation. Flavell (1987) identifies three types of metacognition: knowledge of self, knowledge about various cognitive tasks and strategy knowledge (Boekaerts 1997).

The first of these should not be confused with self-concept, which appears to be quite a subjective element, although there have been attempts to delineate it in a more hierarchical way (Zimmerman 1989). While metacognition is often associated with issues such as self-efficacy, which involves "personal judgements of one's capabilities to execute courses of action to attain academic achievement" (Bandura, 1977), self concept is more aligned with self-esteem, a personal and less concrete construct. When one considers that students who don't see themselves as 'smart' or able enough often adopt self -handicapping strategies or overcompensate with effort (Brooks 1997), the centrality of self-concept to self regulation is immediately apparent.

Markus and Nurius, 1986 cited by (Garcia 1994) introduce the notion of self-schemas, which combine the cognitive and affective elements of self awareness as "the cognitive manifestation of enduring goals, aspirations, motives, fears and threats." This overarching notion highlights both the similarities and differences between self concept and metacognition. At the heart of each is an awareness of self, and while high self-consciousness is associated with a desire for self-knowledge, low self-consciousness breeds intellectual defensiveness.

Self-monitoring and Motivation

(Weinstein 1986) see all metacognitive activities as partly the monitoring of comprehension, and it would appear that this ability to monitor oneself is what distinguishes metacognitive activity from domain specific cognition. Self-monitoring is an initial step towards the development of cognitive strategies, but as will be shown later, continuous self monitoring is also a strategy in itself. Depending on ones theoretical orientation, this component can manifest itself as social cognitive self-observation, Vygotskian inner speech, or behaviourist self-recording (Zimmerman 1989). Regardless of whether one views cognition itself as an important construct, however, self-monitoring is a pervasive key process to self-regulation.

Motivation results from the actualisation of self-concept. Anxiety, for example leads to a low level of motivation (Zimmerman 1989). While it has been argued that all people are inherently motivated to learn, most of us have experienced difficulties in maintaining motivation, and research has shown that in education, intervention that impinges on self-concept such as unfavourable appraisals by teachers can result in drawing learners' attention away from the learning process (Boekaerts 1997). The ability to maintain motivation is one of the main tenets of self-regulation (Zimmerman 1994).

Self-monitoring and motivation are the primary internal sources of self-regulated strategies. However, there are also factors which are external to the learner which directly affect self regulation.

Environment and Context

Social cognitive approaches have long asserted a bidirectional relationship between external and internal states - role models who overcome adversity might encourage observers to try a task for themselves, for example (Zimmerman 1989).Not only the quality of teaching, but other factors beyond the learning situation have a direct effect on self regulation. (Ertmer 1996, p 747) claims, "outside pressures in students lives may increase their vulnerability to other instructional factors (type of case, time of day, length of lab) that impede [students'] use of self-regulation skills." Ertmer's study relates to the use of case studies for self regulated learning and this highlights another important issue.

The nature of a discipline itself is a unique context, with differences in both teachers' and students beliefs about learning. (VanderStoep 1996) observes different levels of regulation across multiple disciplines, and this has a profound significance for self-regulation, because while self-regulation itself may be veiwed as a generic skill, some of the strategies employed may be pertinent only to speicific domains.

Volitional and Cognitive Strategy formation

As the end product of self regulation, a student is able to activate strategies which enhance their learning. These take the form of volitional strategies, as well as congnitively based learning and regulatory strategies. It has been argued that Self-Regulated learning is "a fusion of skill and will" (Garcia, 1995, cited in Brooks 1997), and certainly effort, stemming directly from motivation, is a concept that most students are able to recognise as a controllable aspect, using it to explain their performance to themselves rather than other explanatory mechanisms (Pressley 1998).

Volition differs from motivation in that motivational processes mediate the formation of and promote decisions, while volitional processes enact and protect them (Corno 1994) Therefore motivational self regulation is dependent upon strategies that activate effort to achieve learning goals. (Garcia 1994). There are several strategies that students use to control effort.

Self handicapping is the withholding of effort or putting obstacles in the way to maintain self concept, while self affirmation maintains self concept through reassessing the value of different domains (Garcia 1994). Defensive pessimism is a coping process which enacts effort through the fear of failure (Boekaerts 1997). Motivational attributions refers to the causality students use to explain performance both retrospectively and prospectively, but regardless of the strategy used, they are all "affectively laden processes" that are related to an individual's self concept.

At a more objective level, students use self-monitoring techniques to support their learning as well as to regulate external factors. Cognitive learning strategies include rehearsal, elaboration, and organisational strategies, as well as memorization through clustering, imagery, use of mnemonics and so on (Weinstein 1986). Typically, deeper cognitive processes (such as transformation - the creation of something new out of existing information) are more successful than ones which engage in knowledge as a static entity, such as rehearsal (Risemberg 1996). It is important to note, however, that knowledge of these learning strategies is not enough to ensure that they take place. Regulation strategies must be implemented to co-ordinate effort and task.

(Garcia 1994) identifies three regulatory strategies that are highly correlated but do have some differences. These are planning, monitoring and regulation. While learning strategies are usually internally developed, regulation strategies have a role in accomodating the environmental and contexutal factors discussed above.

One central concept to planning is that of goal formation. Typically, teacher goals are more distant and abstract than students', and those students who set more proximal goals tend to perform better academically (Boekaerts 1997). Goals are best when they are developed by the student rather than imposed by the teacher, in which case they tend to be viewed as obligations (Brooks 1997). While achieving good grades is a frequently stated goal for students (Pressley 1998), process rather than product goals are more closely correlated with self-regulation (Ertmer 1996).

Monitoring strategies can include tracking of attention, self-testing and self-questioning, as well as monitoring comprehension during learning activities These are closely linked to regulation which manifests itself as a controlling process that results from monitoring (Garcia 1994). An example of this might be a student who reads a passage in a text slower upon arriving at a section which he or she finds conceptually challenging. A final cognitive strategy is resource management. Tied in directly with environmental factors, these involve the regulation of external aspects such as time, study environment, and help-seeking, as well as teacher and peer interaction (Garcia 1994)

Enhancing Self-Regulated Learning

The above framework can provide a useful heuristic in the development of Web based courses. A well designed learning environment should be able to operate on both affective and cognitive processes to activate self-regulated learning. However, while the above model articulates the dimensions of self-regulation, it does provide prescriptive information on how to enhance it.

In the broadest psychological terms, the self-regulated learner operates at a high level of self awareness and self concept. The learner activates self-monitoring and motivational processes, which are enabled through the use of volitional, cognitive and regulatory strategies. As teachers, however, the need is to work at the process level. The learning environment needs to activate motivational and self-monitoring processes, through the implementation of strategies that involve volitional, cognitive and regulatory mechanisms, with the end result being a confident self-aware learner.

It would seem, therefore, that desig for self-regulation should treat metacognition and self-concept as an end product. The key processes of self-monitoring and motivation can be enhanced through the integration of the strategies which self-regulating learners typically access to facilitate these processes within themselves. It needs to be acknowledged that the implementation of such strategies is not going to automatically create self-regulation. In fact, it could be argued that self-regulation is contradictory to teaching actual strategies since it is something that comes from the student rather than being externally imposed (Brooks 1997). This paradox is obviously untenable. For students to develop self-regulatory strategies, they need to be made made aware of them and use them in an initially guided and structured manner. (Oliver 1999) identifies three components which are integral to the learning process: Learning Supports; Activities; and Resources. Typically, on-line learning includes a high level of resources and incorporates activities, but is often designed to be 'teacher free', and thus impoverished in learning support.

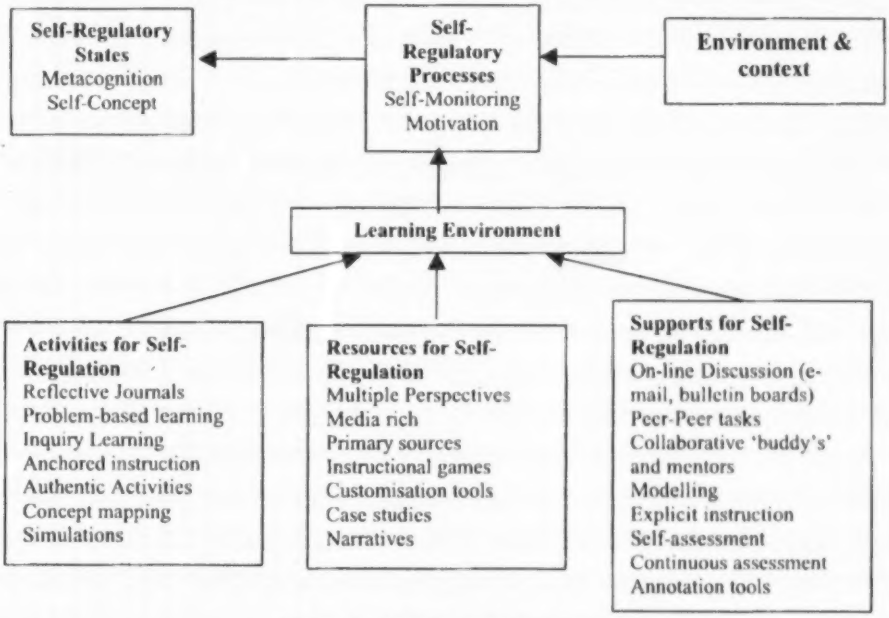

Figure 2 - Self-Regulatory Processes

While this is not usually an issue for students who have a high level of self-regulation, the lack of support is problematic for students whithout this skills. Therefore this paper advocates a process of scaffolding and fading. A high initial level of support for learners is faded over time as they develop their own regulatory and learning strategies (Winnips 2000).

Figure 2 indicates how the self-regulatory processes of motivation and self-monitoring may be enhanced through the integration of learner activities, learner supports and learning resources in an on-line environment. The contention is that the strategies inherent in these elements can provide the necessary learning, regulatory and volitional tools to activate the processes that give birth to self-regulation. Students engage in the resources and activities in the context of support which both models them and makes their role in Self-Regulated Learning explicit for them. As the level of support is reduced, learners may then initiate the strategies themselves in their own ways.

Discussion of Enabling Strategies

The strategies presented above represent, while not intended as a complete or authoritative list, can assist designers of on-line learning environments when considering how best to activate regulatory processes. Activities which stimulate reflection such as journals have been promoted as effective prompts for students own initiated approaches, integrating techniques such as progress worksheets and behavioural graphs (Zimmerman 1989). Also, encouraging students to solve problems while simultaneously reflecting on their own problem solution process can improve their metacognitive knowledge & skills as well as performance (Boekaerts 1997). Activities can also be grounded in authentic and relevant situations to enhance their level of motivation (Keller 1983), and it has been argued that "challenging tasks stimulate self-regulation better than do routine or boring tasks" (Brooks 1997) p. 141.

At the resources level, techniques such as instructional games can provide the impetus to assist in volitional control while narratives can engage the curiosity inherent in motivation (Malone 1981). Keeping resources, complex and real, providing multiple rather than single perspectives can enhance both their relevance and challenge, as well as stimulate the depth of processing required for self-regulation.

This is not to say that the learning environment should be excessively ill-structured. Indeed, having a narrow focus for self –monitoring gives better results than having a broad focus (Brooks 1997), However, "the most strongly advocated approach to including opportunities for student self-regulation is to give students choices" (Brooks 1997). Offering them different ways of learning material and have them compare them, for example, can be an excellent way of allowing users to customise their own relationship with the environment and help their metacognitive processes. Thus, environments that can be customised can assist users in setting their own learning goals.

Learner support can be provided in many forms – through techniques which are automatic such as self-assessment, as well as through peer and tutor interaction. Above all, it is important that users receive encouragement in order promote their self confidence in learning. (Zimmerman 1989). They need to be made aware that learning is hard, even for good students. This allows them to elaborate their motivational beliefs and relate them directly to strategy and capacity beliefs (Boekaerts 1997). A flexible non-threatening approach to feedback and remediation can go some way to achieving this. It doesn't mean that the teachers' role is reduced to that of security blanket or background facilitator – there is still a role for direct instruction, particularly in making explicit the implicit conventions of discipline specific knowledge. In fact teaching students ABOUT self-regulation is important (Brooks 1997). This can involve telling students to find a quiet place to study, planning adequate time etc. Having formal activities in which students consolidate and organize what they have learned combined with more implicit forms of support such as expert modelling, engages the user in self-regulational approaches and makes the strategies purposeful for them.

It appears then, that Self-Regulation is not an easy instructional aim. Those who are poor regulators aren't likely to be changed quickly; even when students know WHAT to do, it doesn't necessarily mean they'll do it. (Brooks 1997). However, research has shown that it IS teachable, and certainly not ineluctably tied in with intangible and unalterable concepts such as intelligence (Symons, 1986). Learners will not always have access to the level of support which they receive in formal education, and this is particularly true of on-line learning, which is currently prone to high levels of attrition. It is important therefore that thought needs to be given to the process involved in users becoming aware of themselves and their own understandings, which in the end will only make them better learners.

References

Boekaerts, M. (1997). "Self-Regulated Learning: a new concept embraced by researchers, policy makers, educators, teachers, and students." Learning and Instruction **7**(2): 161-186.

Brooks, D. W. (1997). Web Teaching: a guide to designing interactive teaching for the World Wide Web. New York, Plenum Press.

Corno, L. (1994). Student Volition and Education: Outcomes, Influences, and Practices. Self-regulation of learning and performance: Issues and educational applications. D. H. Schunk, Zimmerman, B. J. Hillsdale, N. J., Erlbaum: 229-251.

Ertmer, P. A., Newby, T. J., McDougall, M. (1996). "Students' responses and Approaches to Case-based Instruction: The Role of Reflective Self-

Regulation." American Educational Research Journal **33**(3): 719-752.

Garcia, T., Pintrich, P. R. (1994). Regulating Motivation and Cognition in the Classroom: The Role of Self-Schemas and Self-Regulatory Strategies. Self Regulation of Learning and Performance: Issues and educational applications. D. H. Schunk, Zimmerman, B. J. Hillsdale, N. J., Erlbaum: 127-153.

Keller, J. M. (1983). Motivational Design of Instruction. Instructional Design Theories and Models: An overview of their current status. C. M. Reigeluth. Hillsdale, N.J., Erlbaum & Associates: 386-434.

Loomis, K. D. (2000). "Learning Styles and Asynchronous Learning: Comparing the LASSI Model to Class Journal of Asynchronous Learning Networks **4**(1): 23-31.

Malone, T. (1981). "Towards a theory of intrinsically motivating instruction." Cognitive Science **4**: 333-369.

Oliver, R. (1999). "Exploring strategies for on-line teaching and learning." Distance Education. **20**(2): 240-254.

Pressley, M., Van Etten, S., Yokoi, L., Freebern, G., & Van Meter, P. (1998). The Metacognition of Student Scholarship: A Grounded Theory Approach. Metacognition in Educational Theory & Practice. D. J. Hacker, Dunlosky, J. & Graesser, A. C. New Jersey, Lawrence Earlbaum Associates Inc.: 347-366.

Risemberg, R. (1996). "Reading to Write: Self-Regulated Learning Strategies when Writing Essays from Sources." Reading Research and Instruction **35**(Summer 96): 365-383.

VanderStoep, S. W., Pintrich, P. R., Fagerlin, A. (1996). "Disciplinary Differences in Self-Regulated Learning in College Students." Contemporary Educational Psychology **21**: 345-362.

Weinstein, C. E., Mayer, R. (1986). The teaching of learning strategies. Handbook of research on teaching. M. Wittrock. New York, MacMillan: 315-327.

Winnips, K., McLoughlin, C. & Oliver, R. (2000). Supporting constructivist learning through learner support on-line. Ed-Media 2000, Montreal, Ca., Association for the Advancement of Computers in Education.

Zimmerman, B. J. (1989). Models of Self-Regulated Learning and Academic Achievement. Self Regulated Learning and Academic Achievement: theory, research, and practivce. B. J. S. Zimmerman, D. New York, Springer-Verlag: 1-25.

Zimmerman, B. J. (1994). Dimensions of Academic Self-Regulation: A conceptual framework for education. Self-regulation of learning and performance: Issues and educational applications. D. H. Schunk, Zimmerman, B. J. Hillsdale, N. J., Erlbaum: 3-21.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

☒ This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☐ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").